



Diseño de un sensor fluorescente de fluoruro en papel

Sergio González Alfaro

Workshop Investigación 2023

 @Sergio_Gonza_

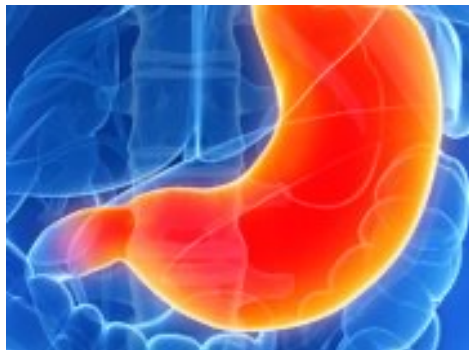
 Sergio.Gonzalez22@alu.uclm.es



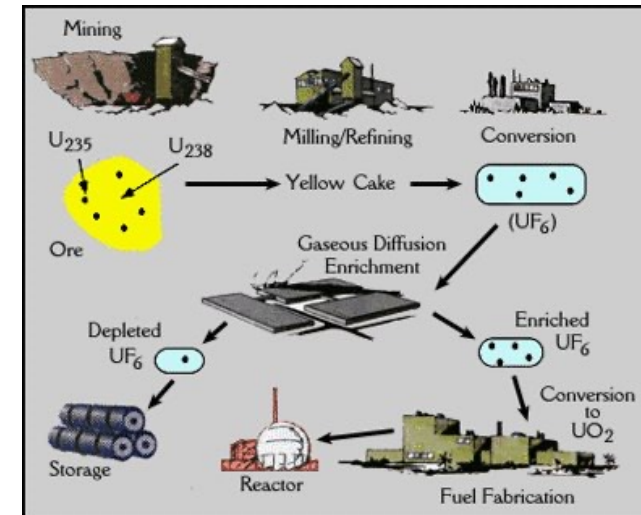
¿Por qué detectar fluoruro?



Fluorosis dental

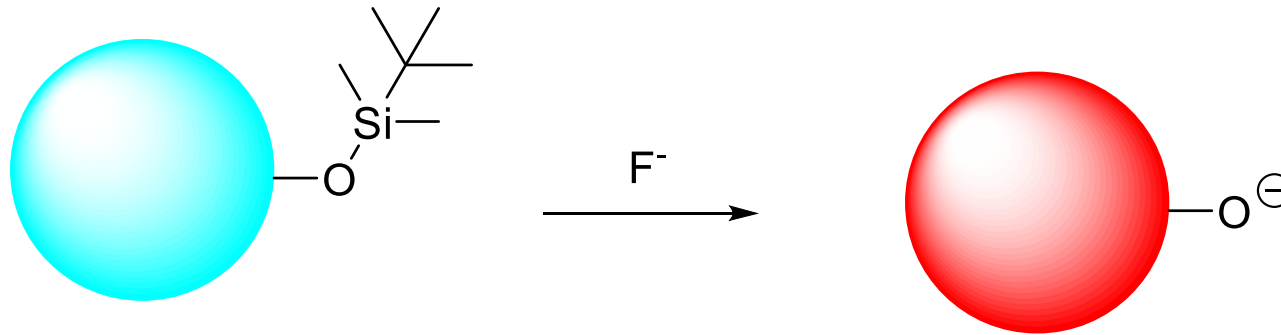


Daño renal y gástrico



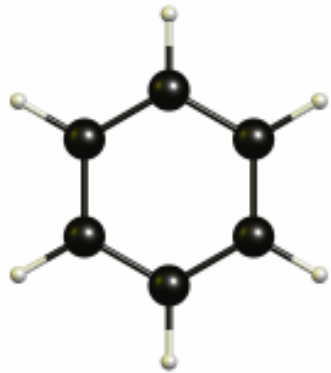
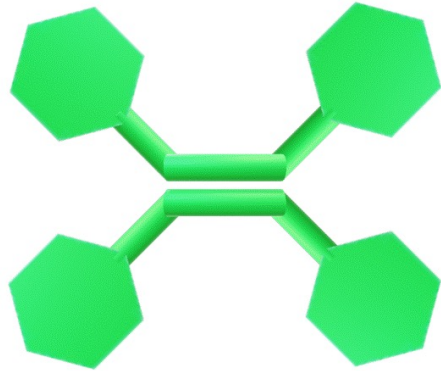


Quimiosensores de fluoruro





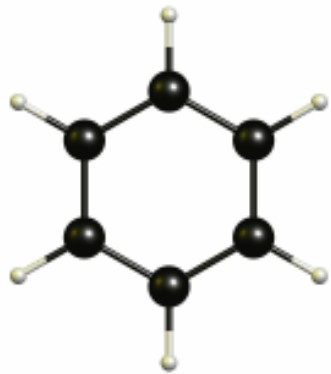
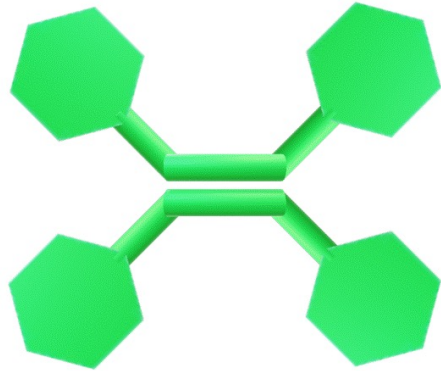
Fenómenos de agregación



Moléculas en disolución

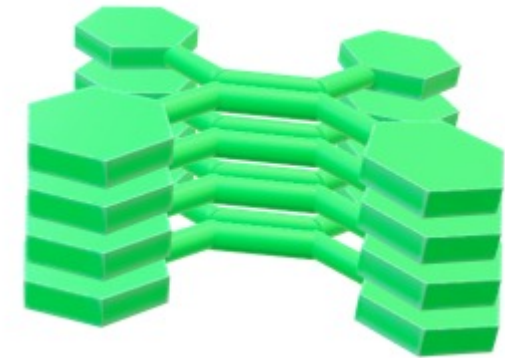


Fenómenos de agregación



Moléculas en disolución

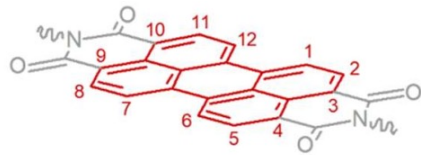
Agregación



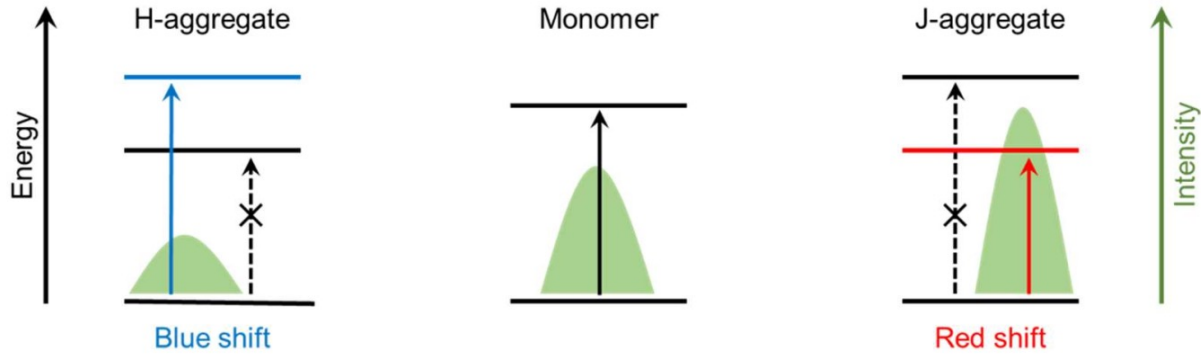
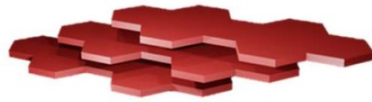
Estado sólido



Fenómenos de agregación

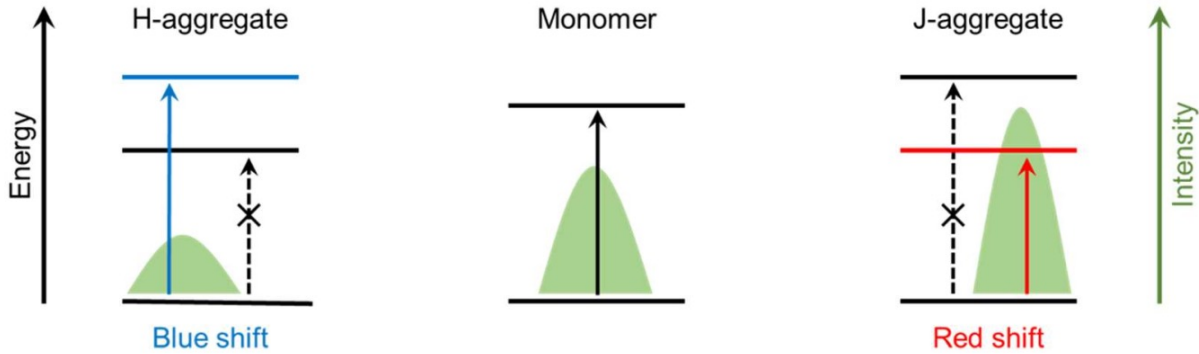
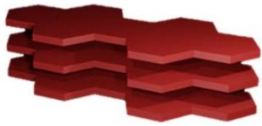
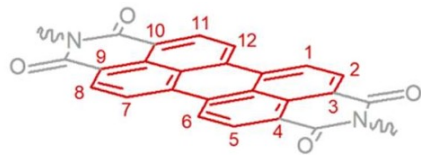


III



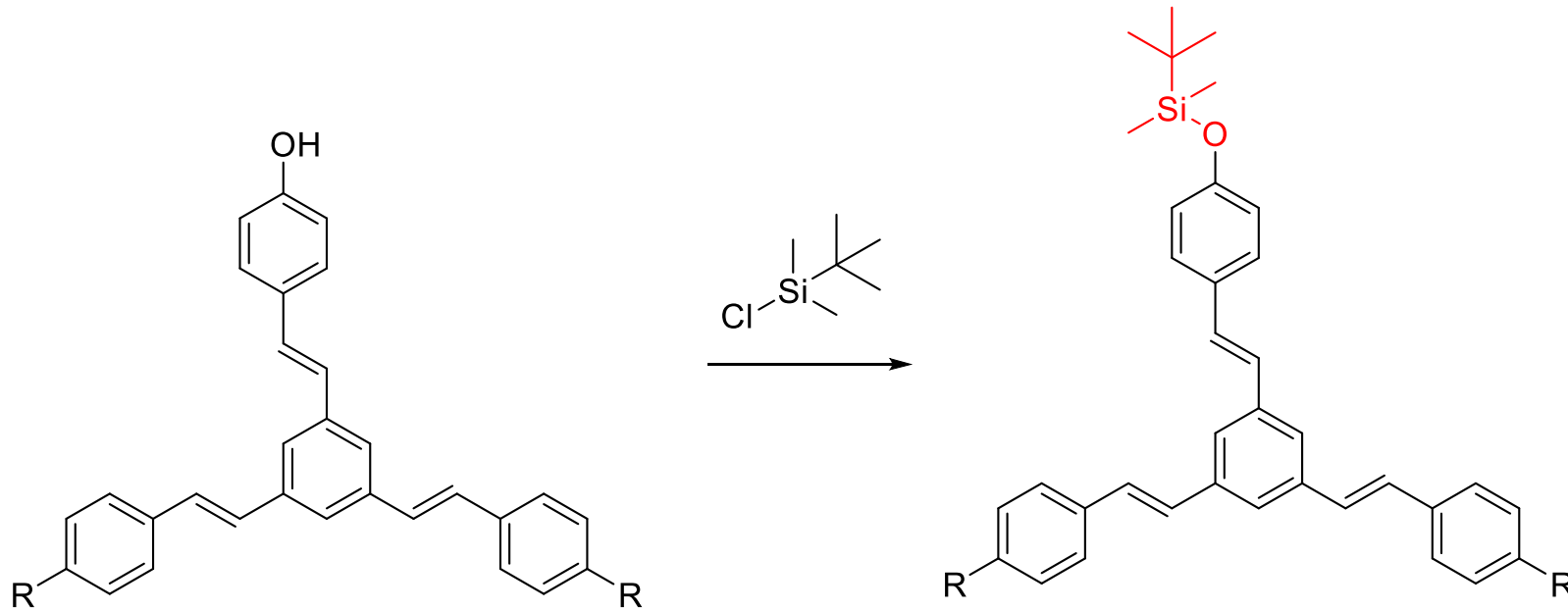


Fenómenos de agregación





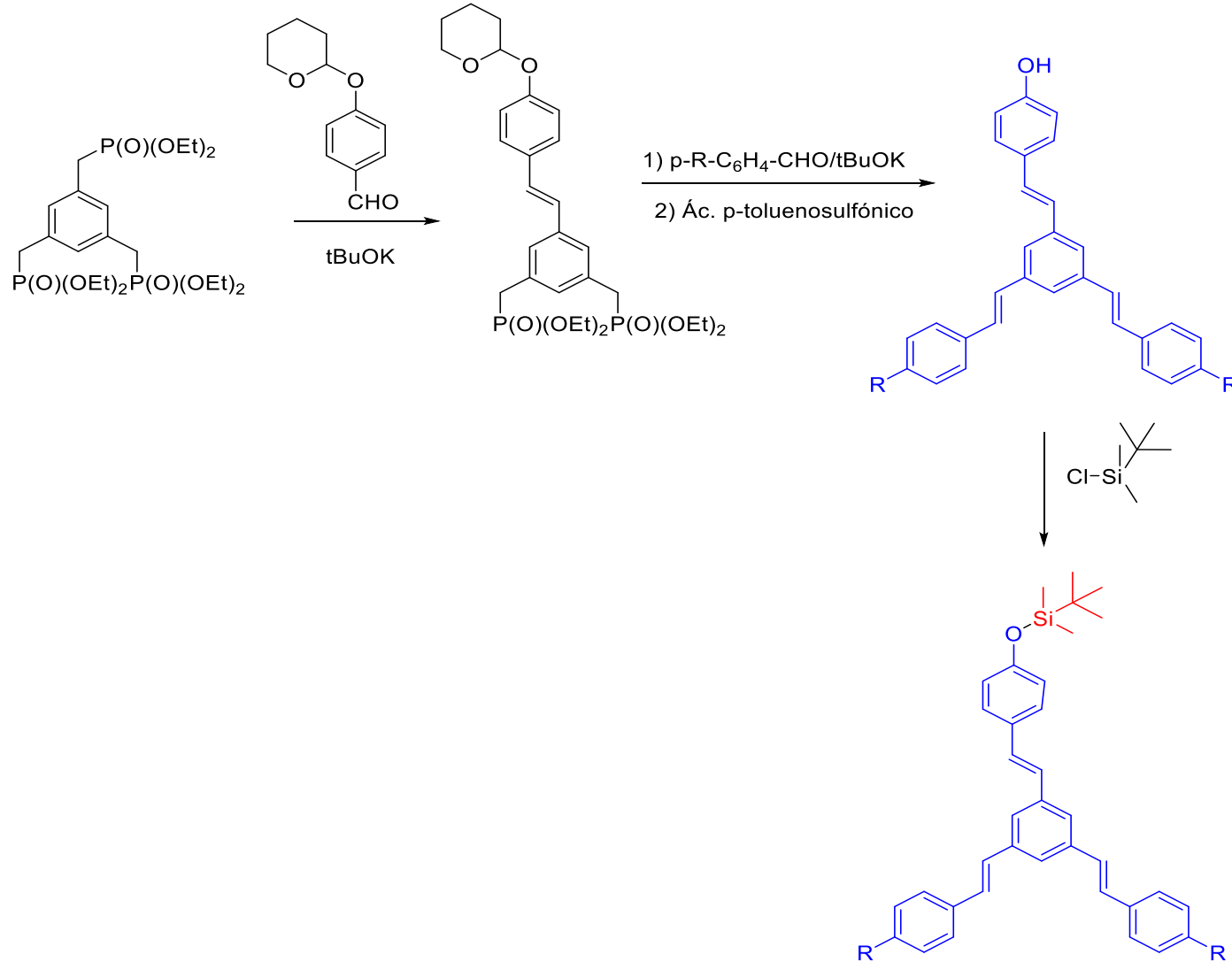
Primeros sensores de fluoruro



¿Fluoruro?



Moléculas candidatas

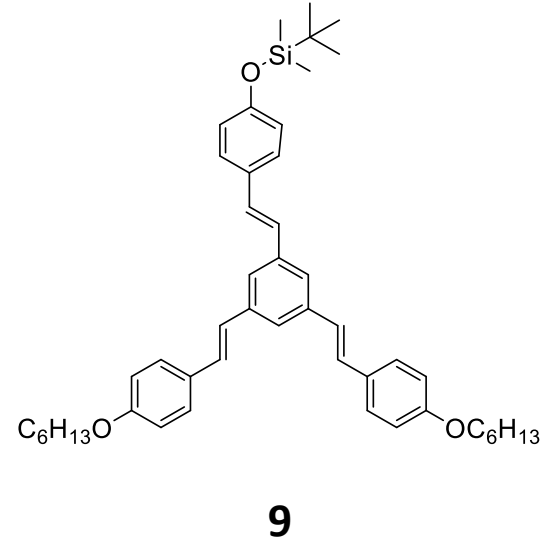
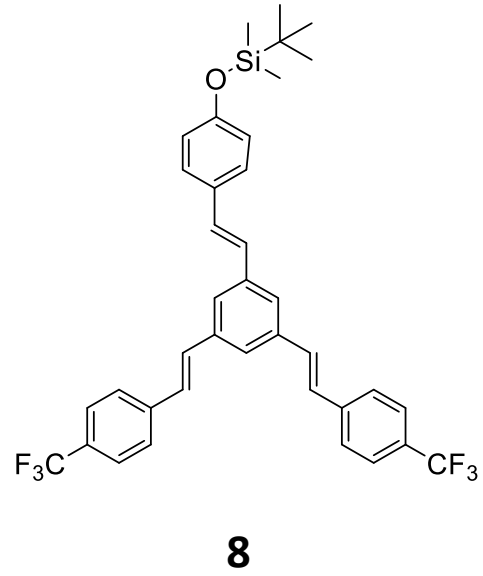
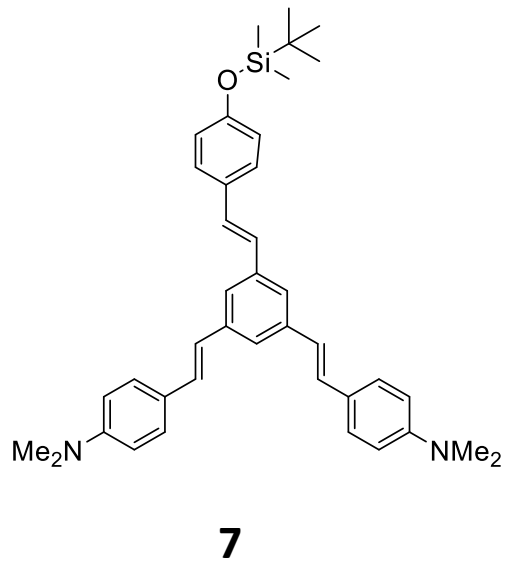


Núcleo fluorescente

O-Si sensible a fluoruro

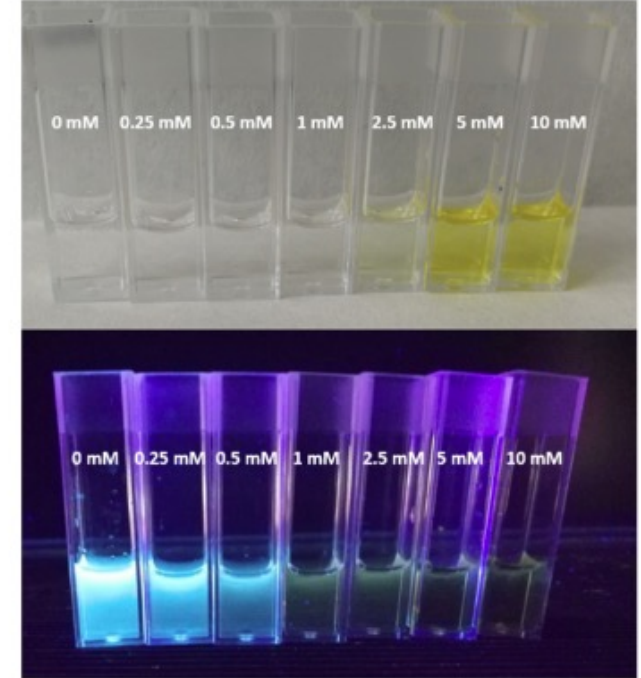
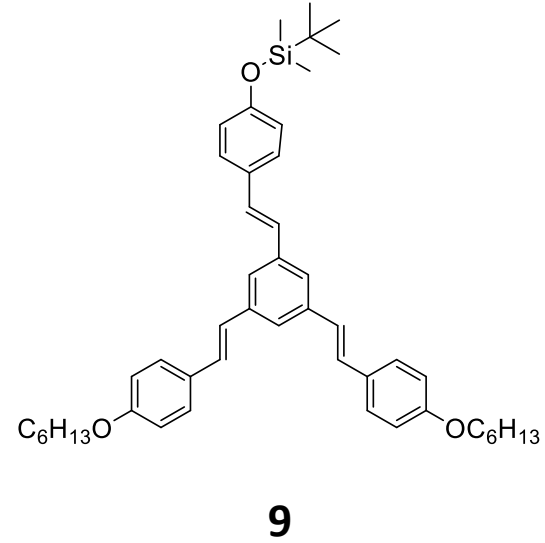
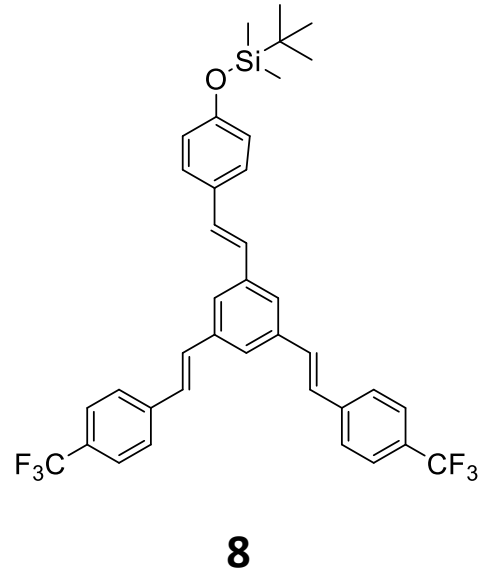
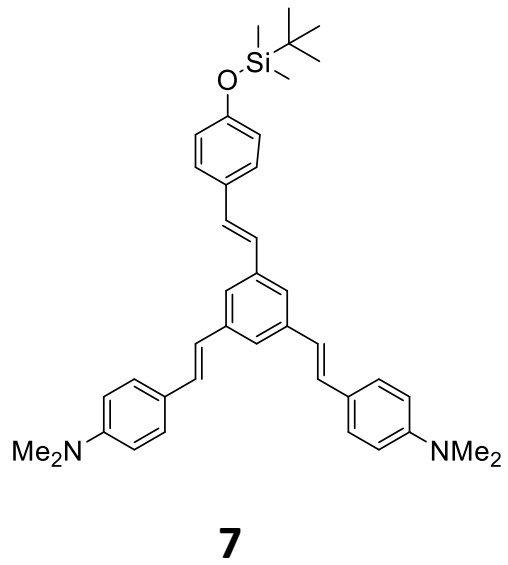


Uso como sensores

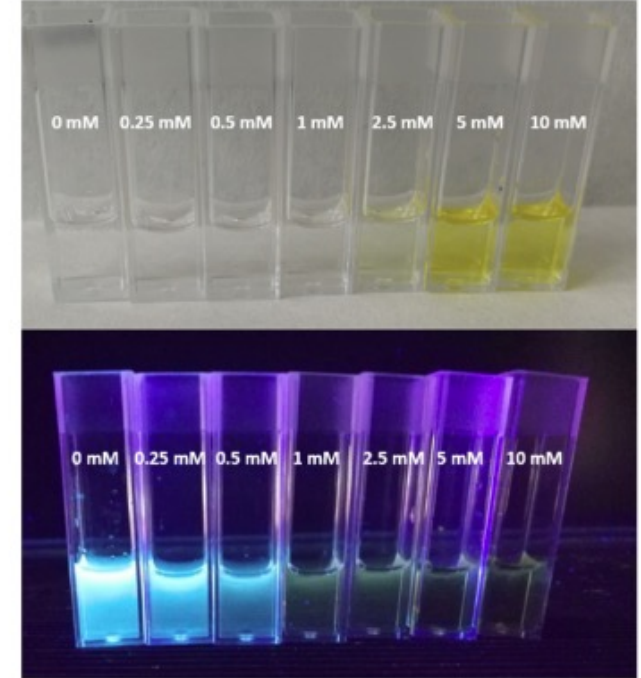
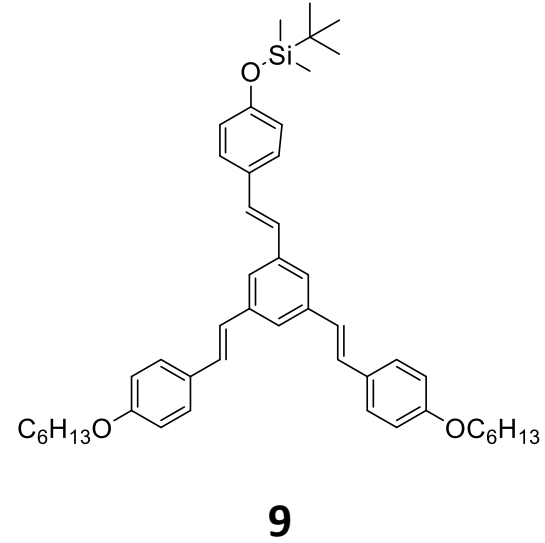
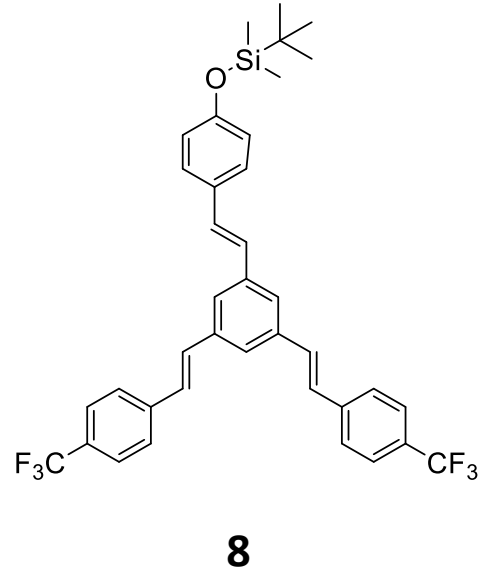
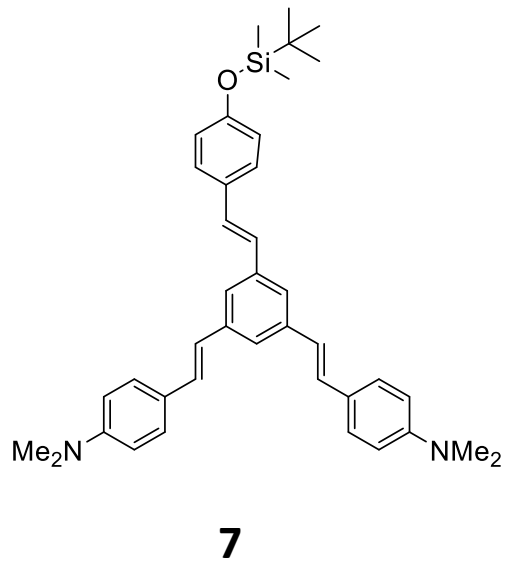




Uso como sensores

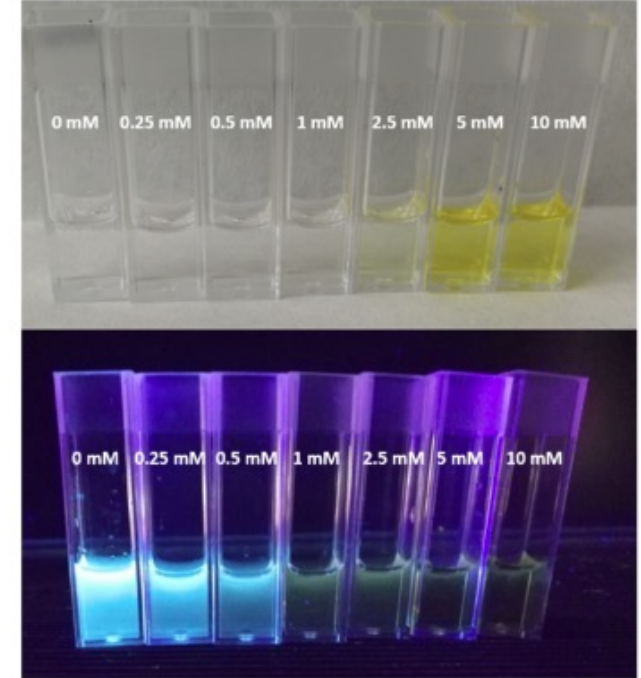
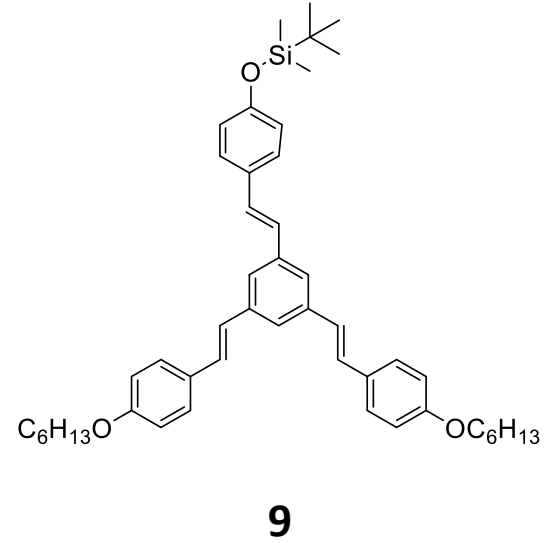
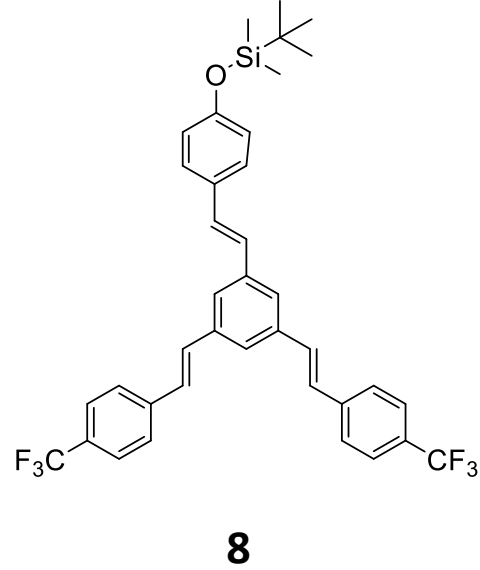
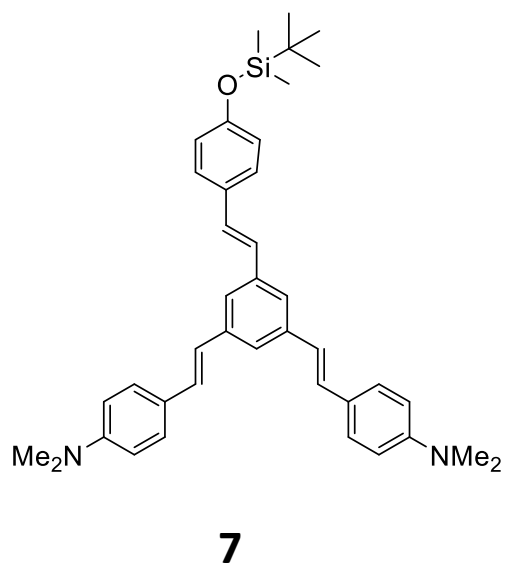


Uso como sensores



Compuesto	LoD(uM)	LoQ(uM)
7	126.25	420.85
8	1.54	5.15
9	16.73	55.77

Uso como sensores

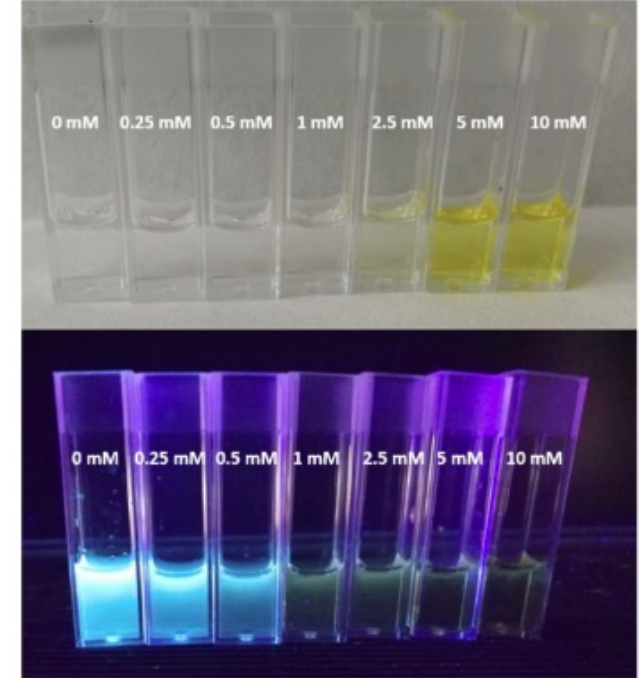
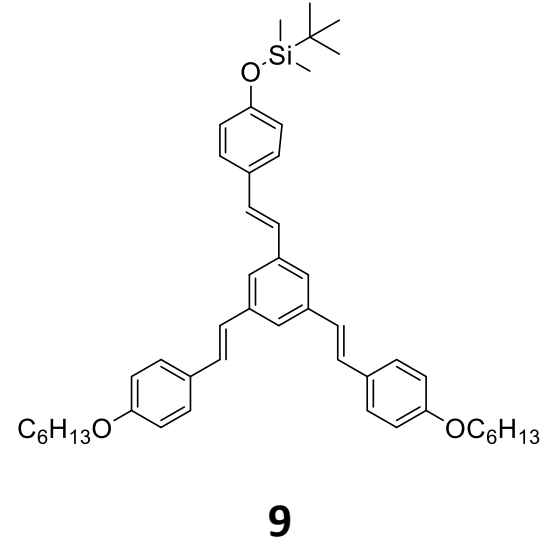
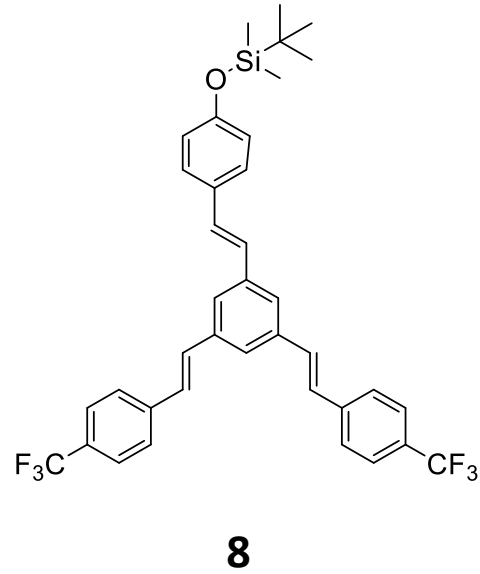
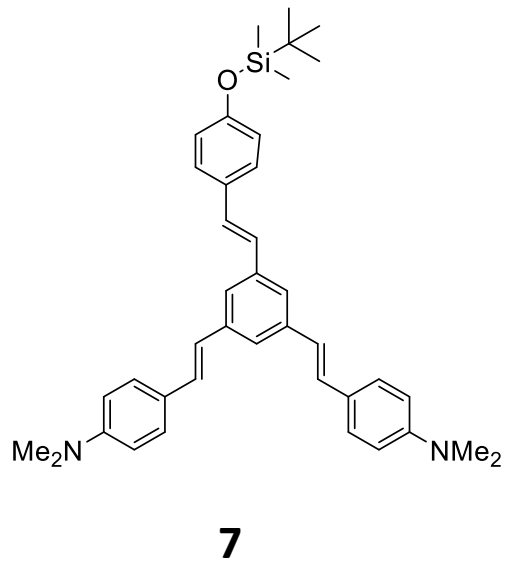


Compuesto	LoD(uM)	LoQ(uM)
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Sensores *turn-off*



Uso como sensores

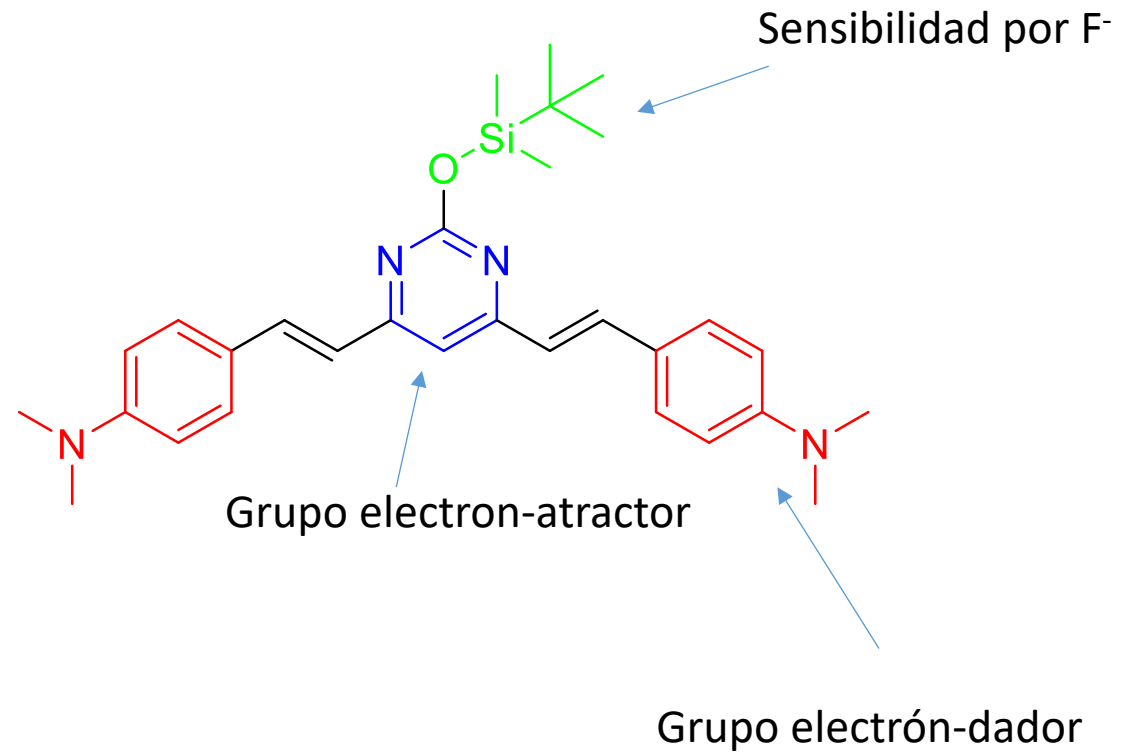
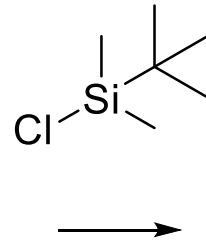
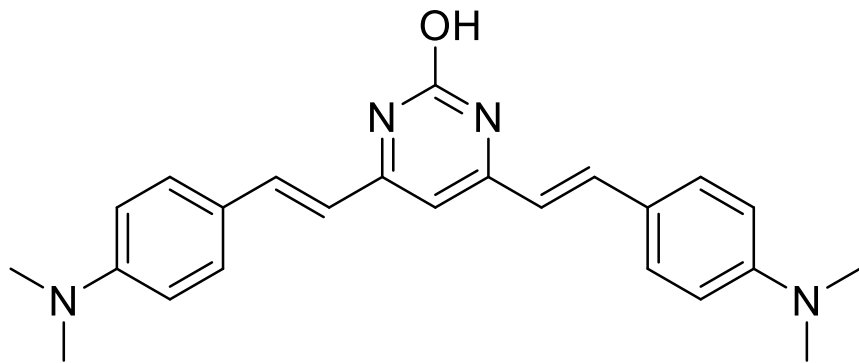


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Sensores *turn-off*

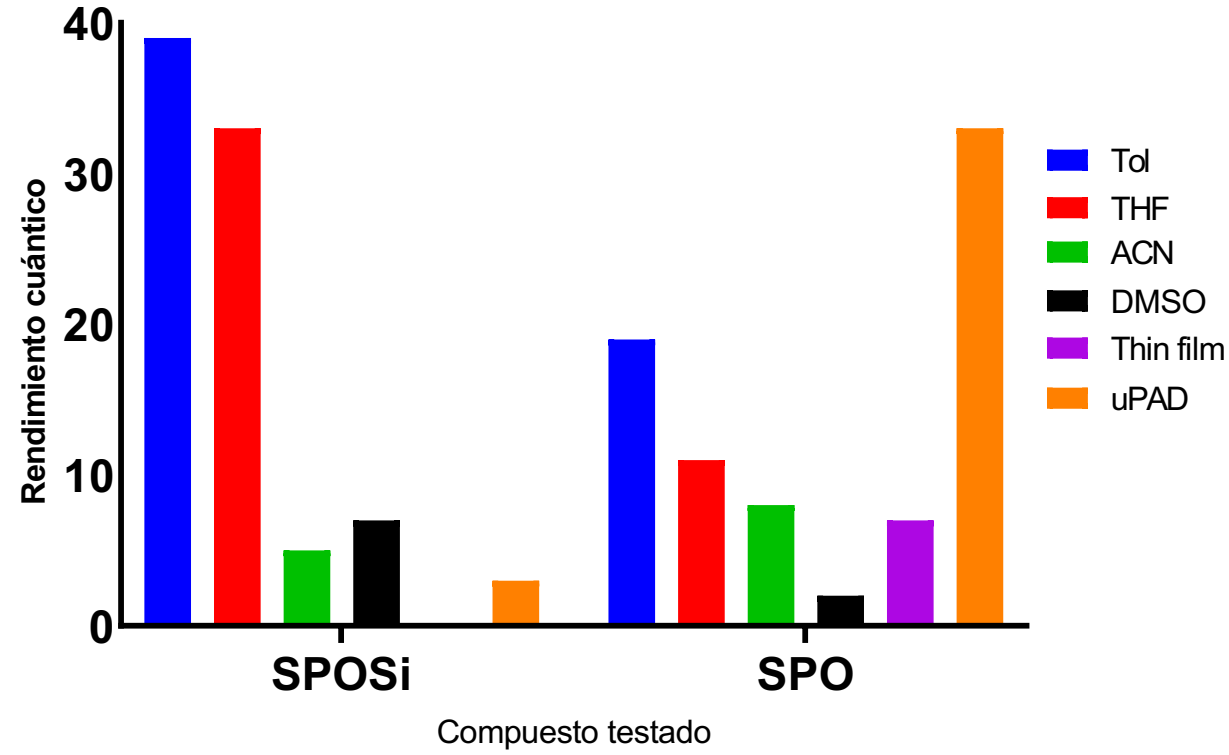
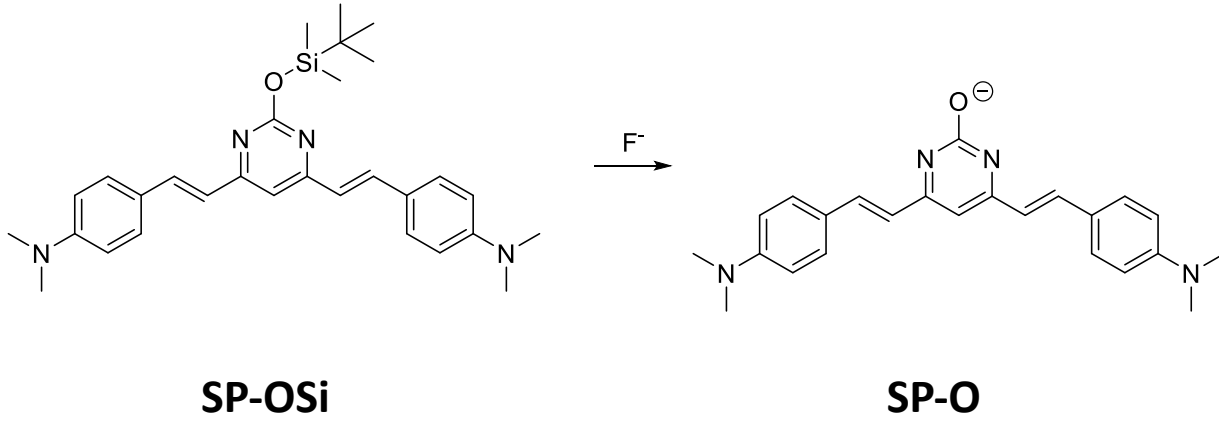


Nuevo fluoróforo buscando AIE



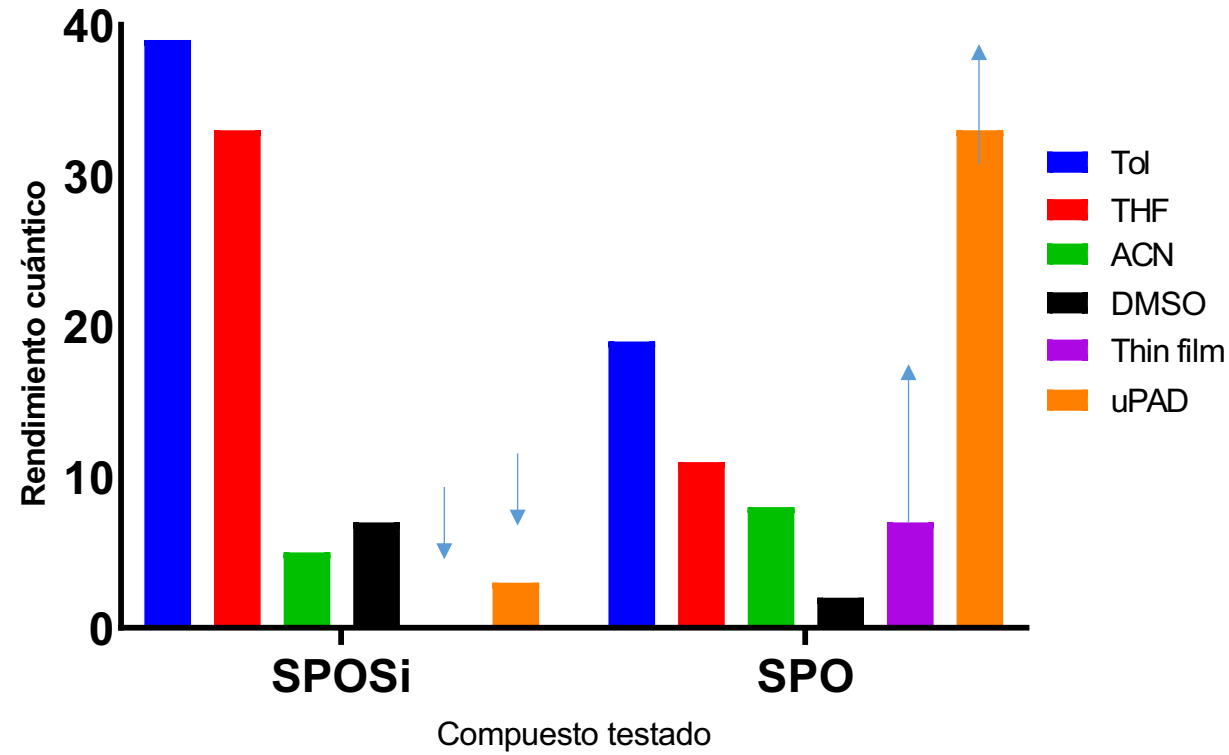
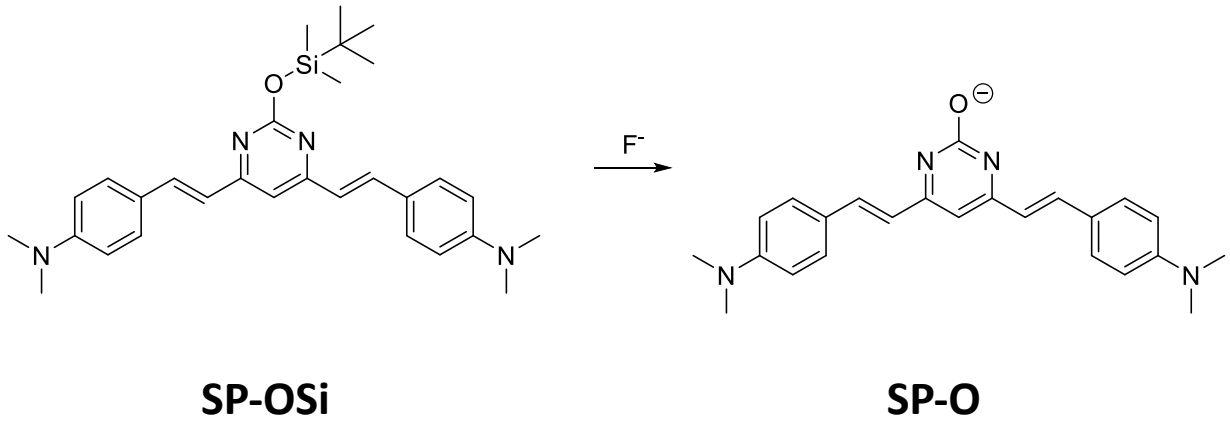


Estudios de agregación



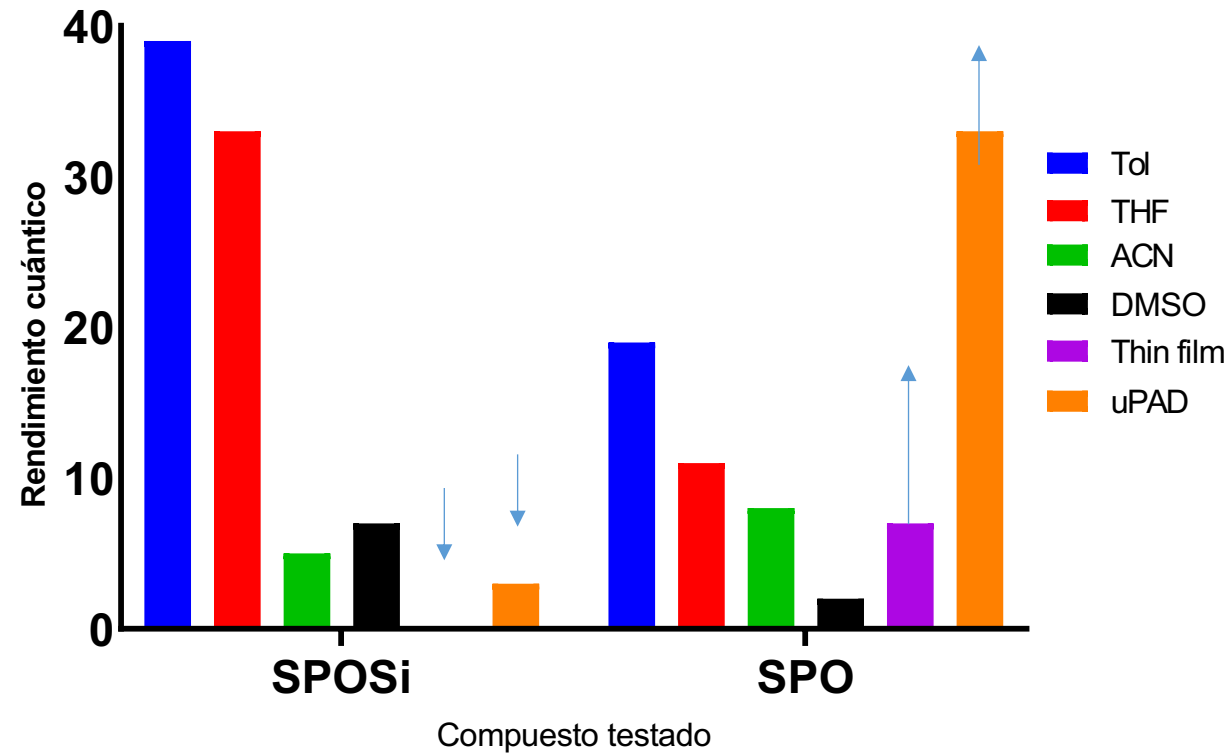
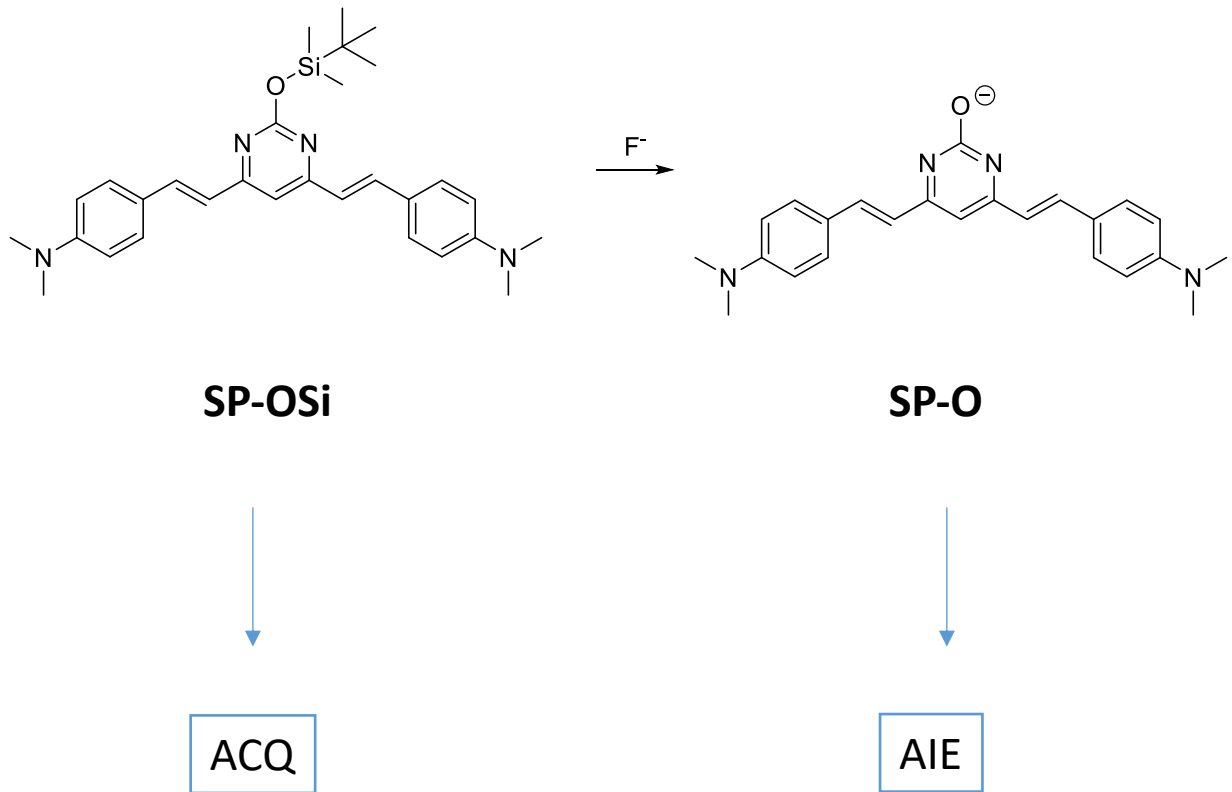


Estudios de agregación



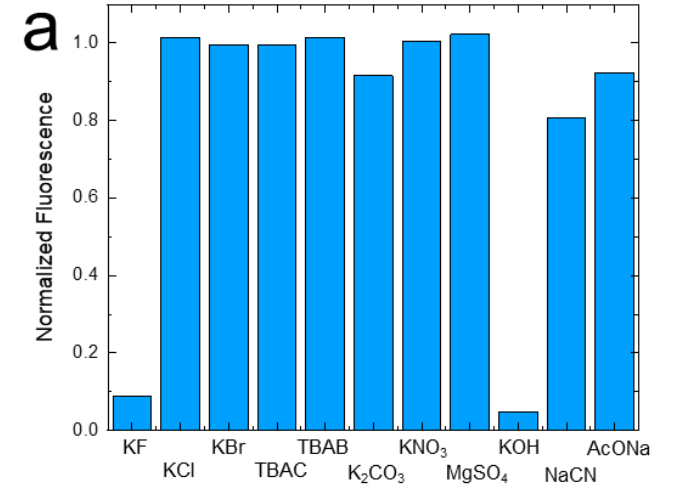
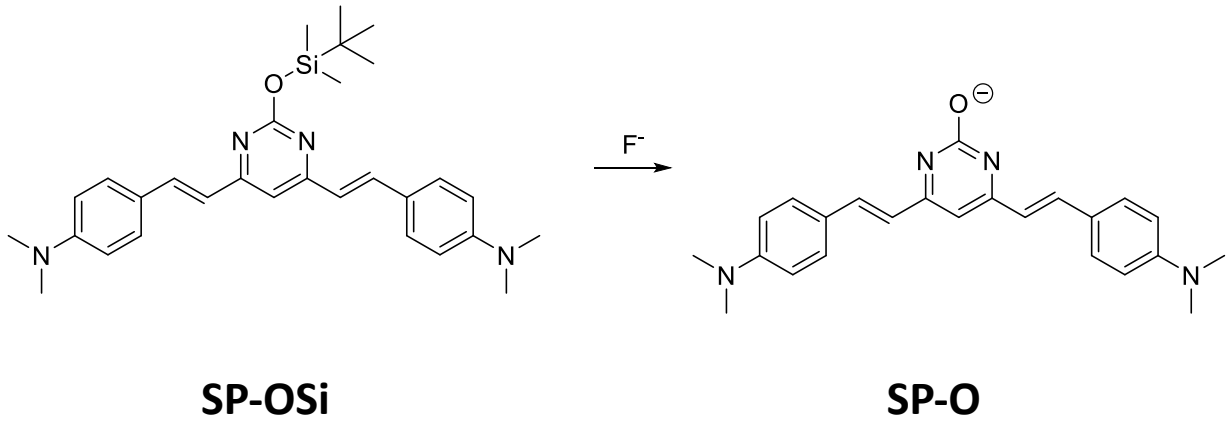


Estudios de agregación



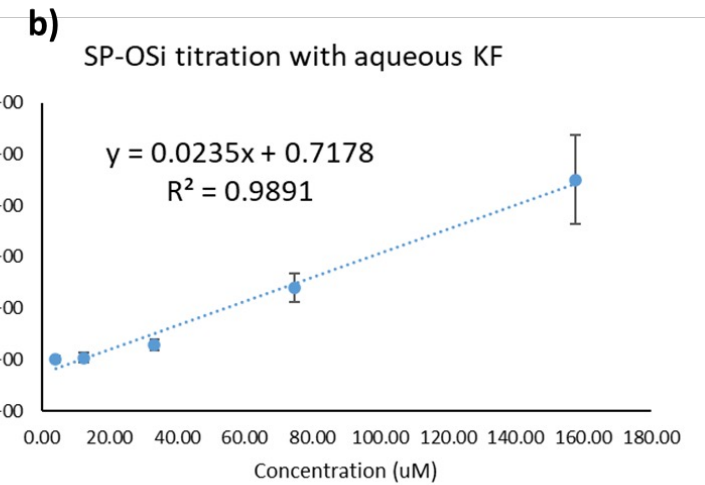
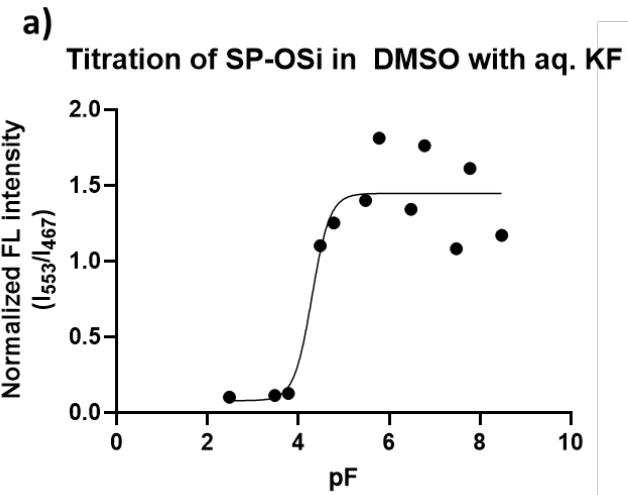
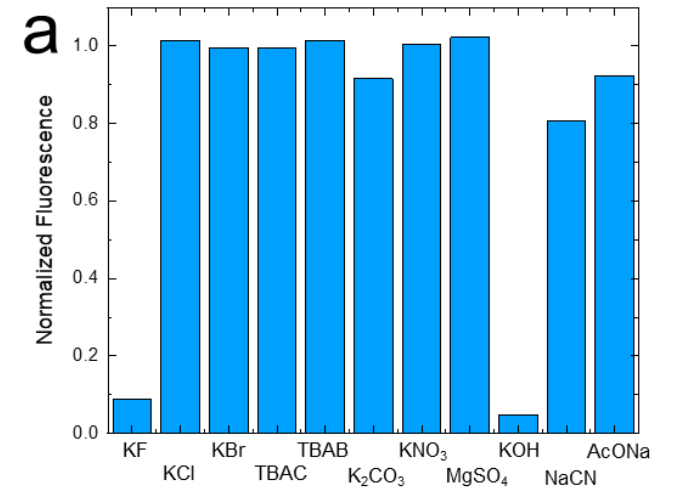
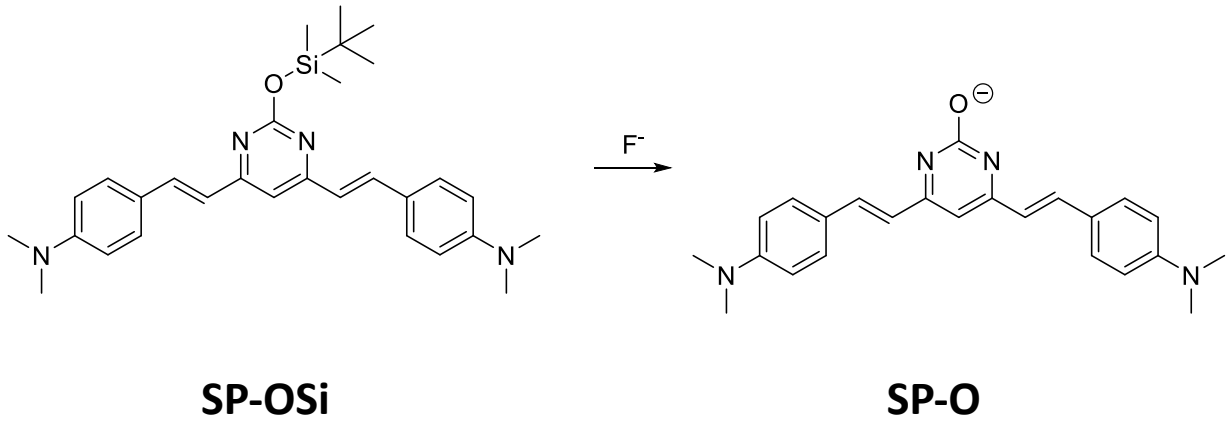


Ensayos en disolución



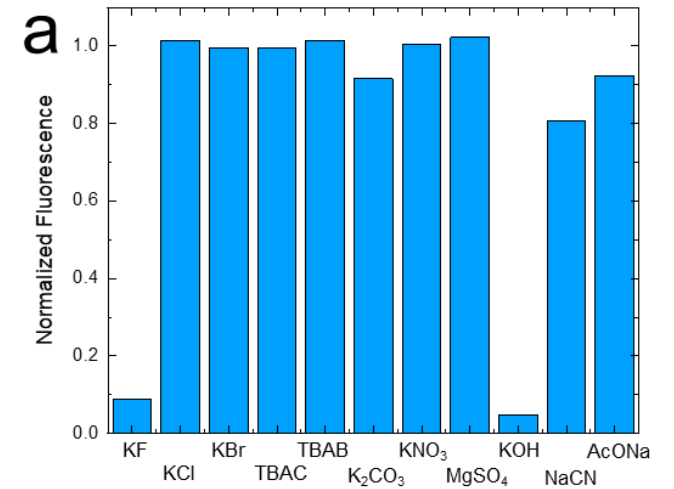
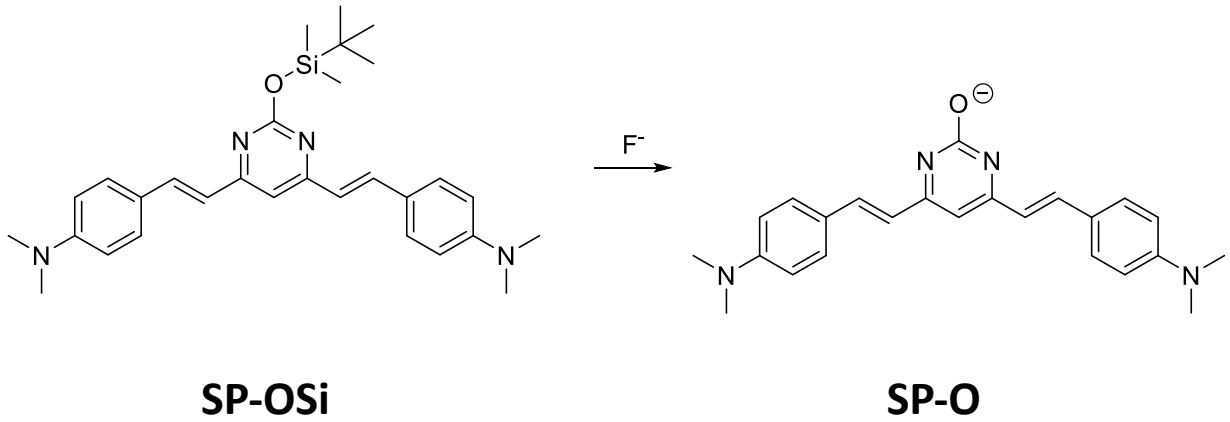


Ensayos en disolución



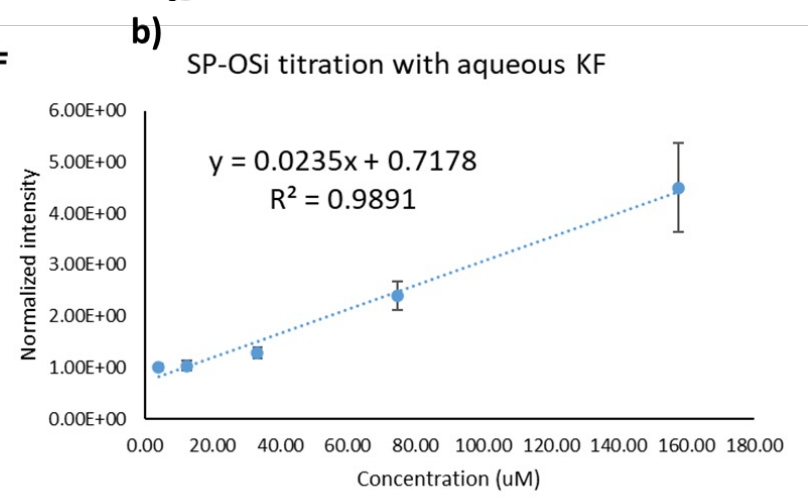
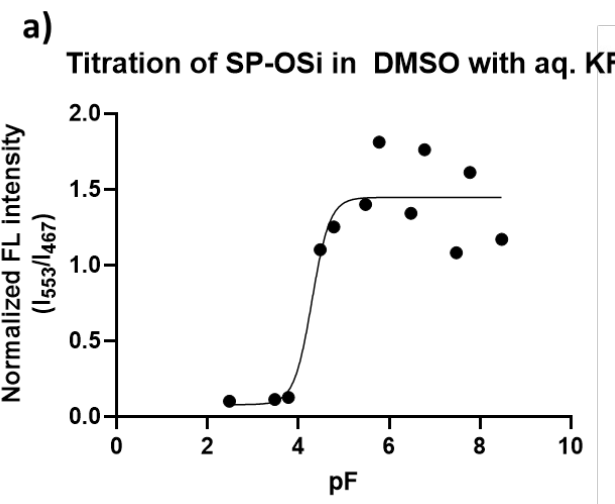


Ensayos en disolución



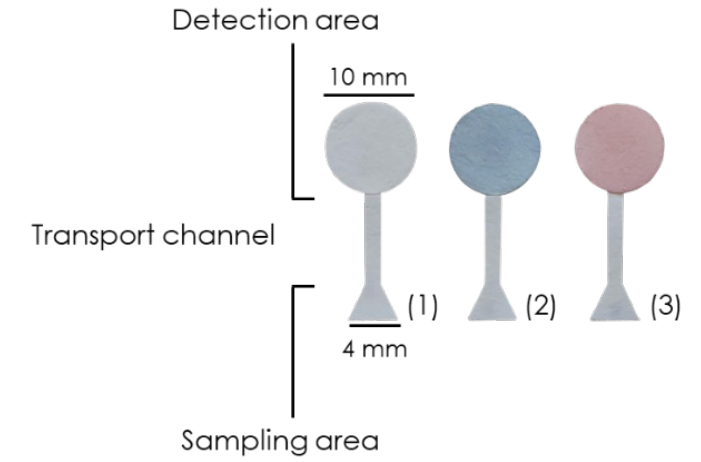
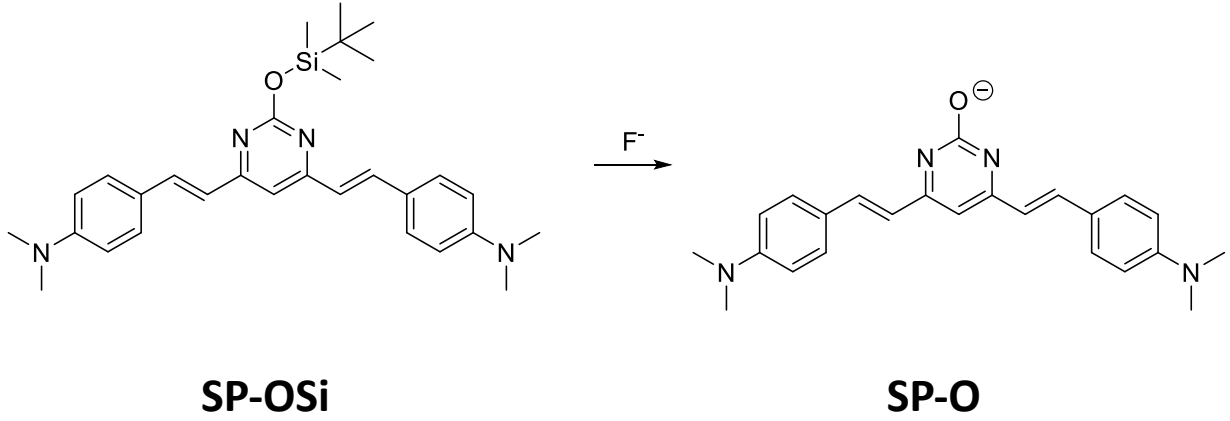
Límite de detección	Límite de cuantificación
14,5 μM (0,59 mg/L)	48,3 μM (1,97 mg/L)

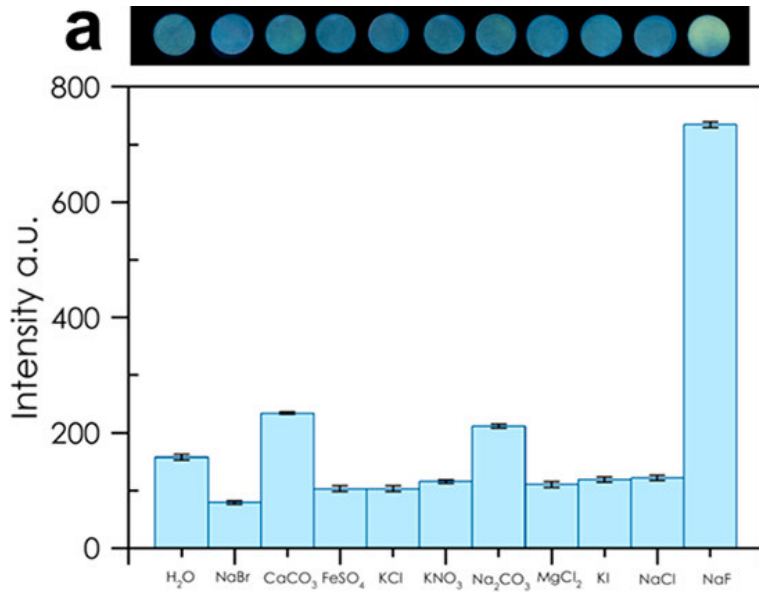
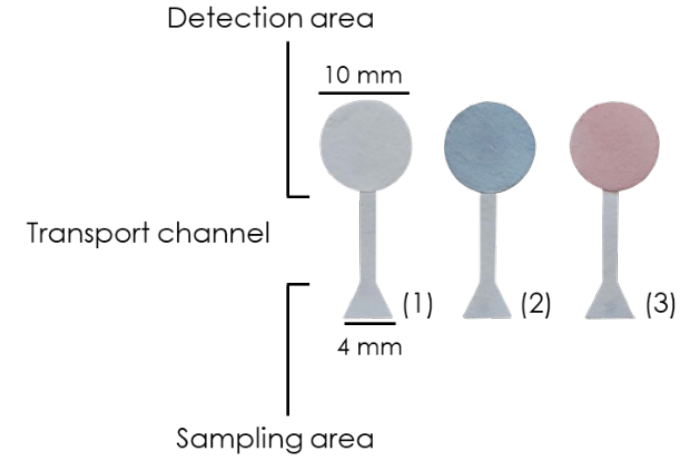
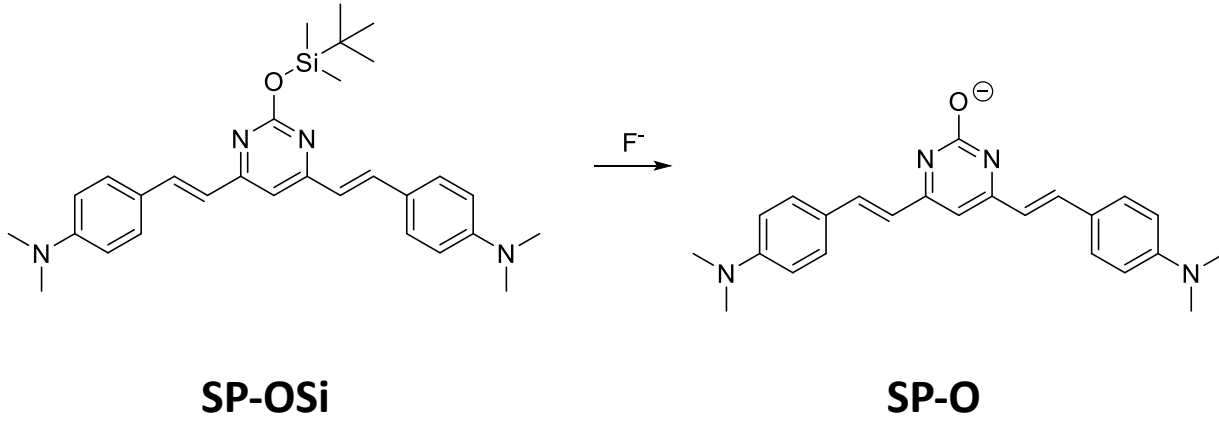
1.5 mg/L





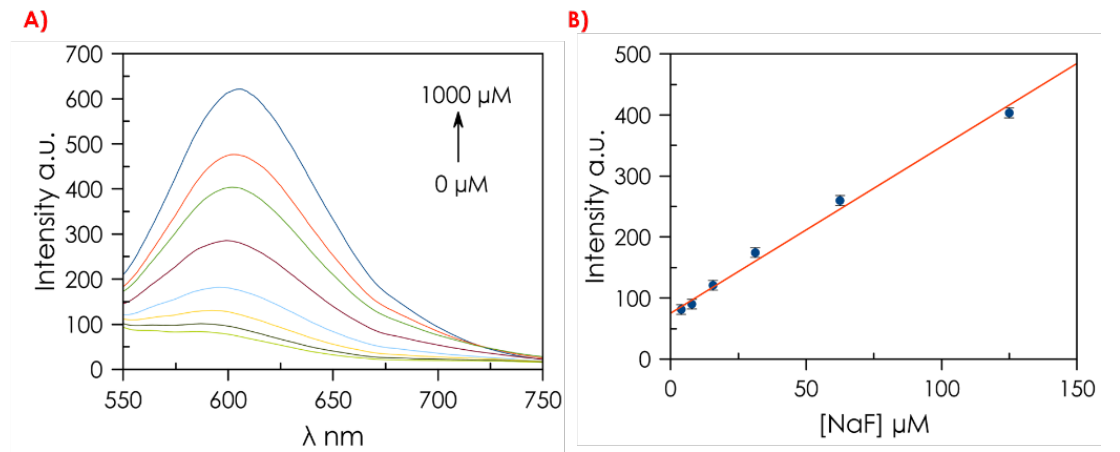
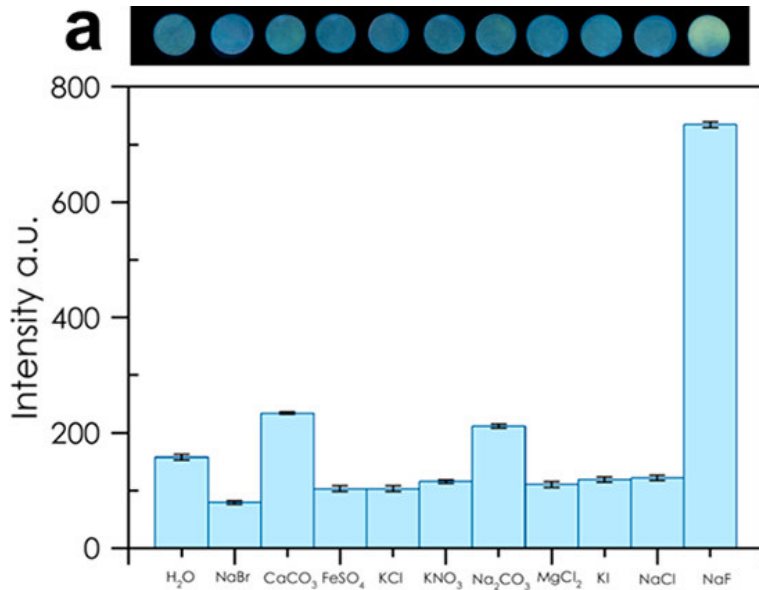
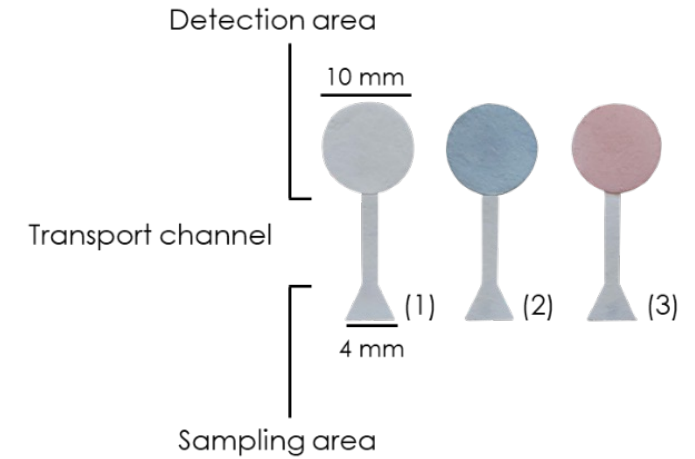
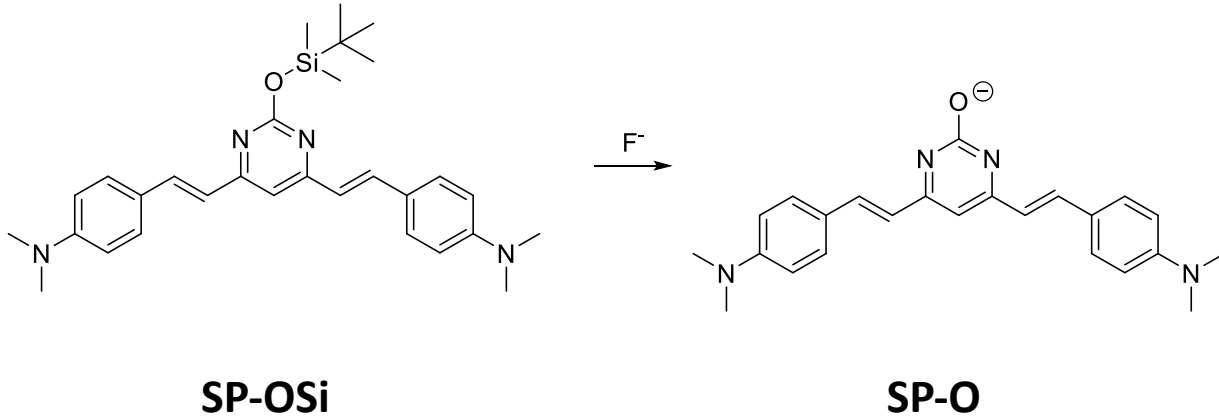
Sensor en papel





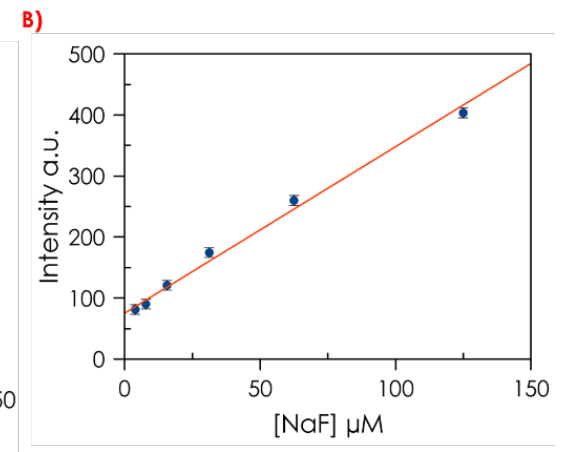
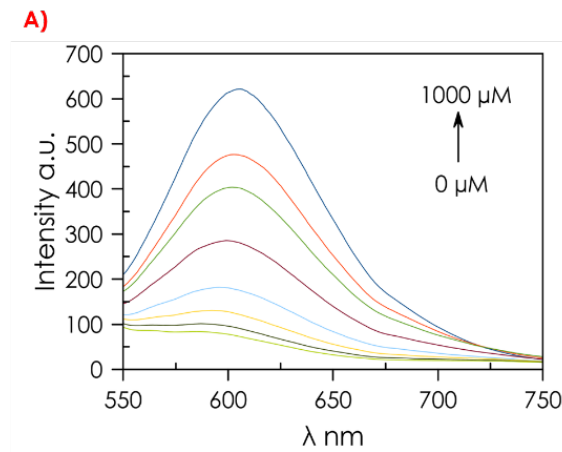
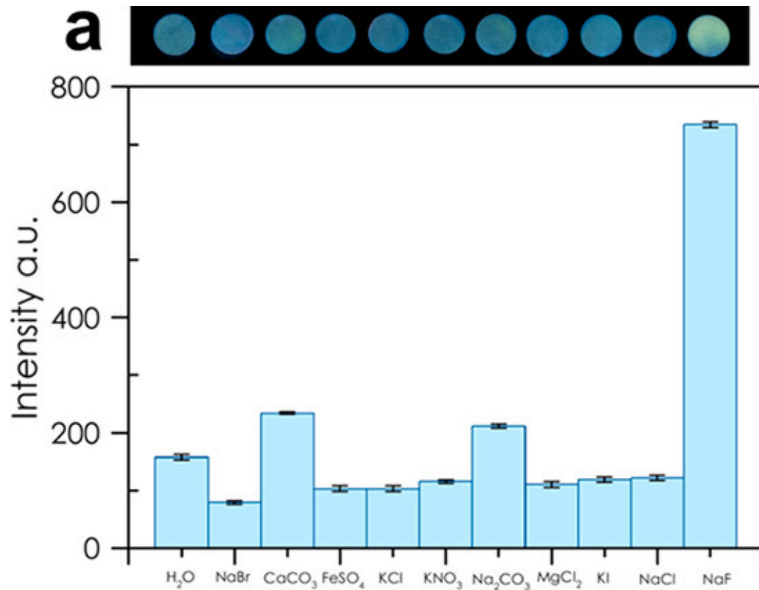
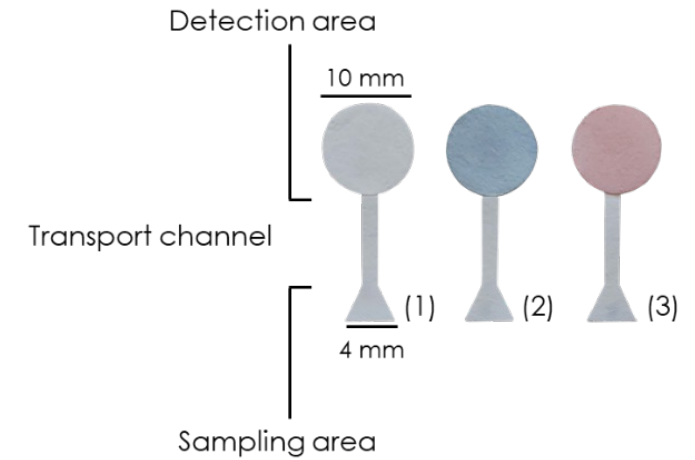
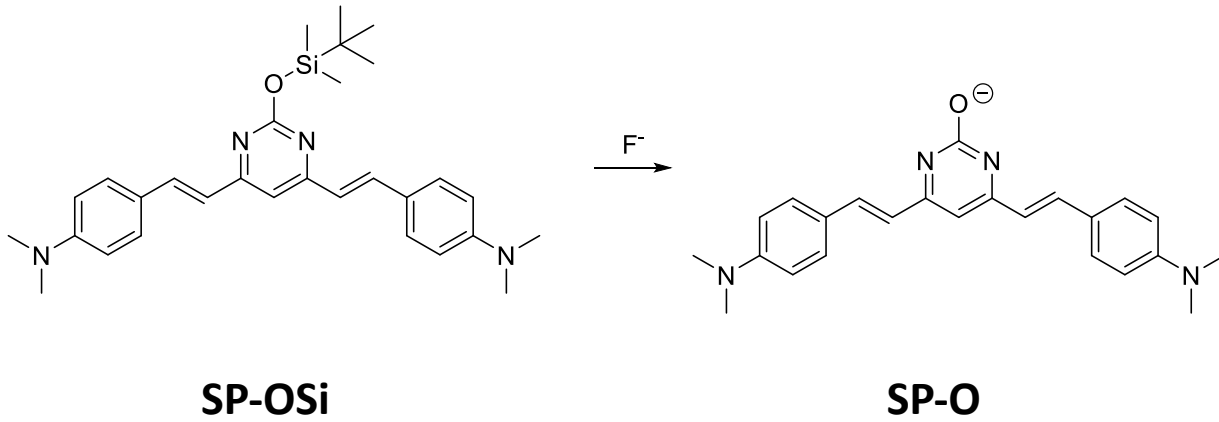


Sensor en papel





Sensor en papel

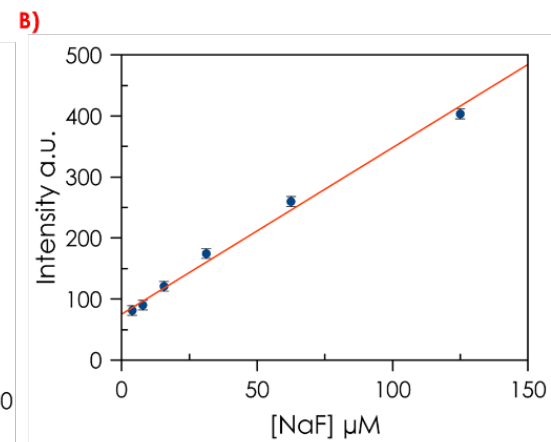
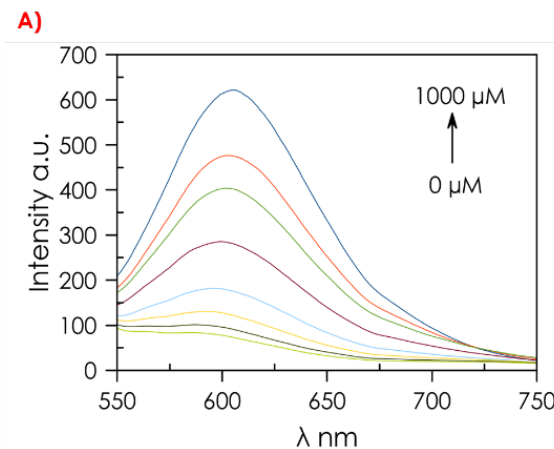
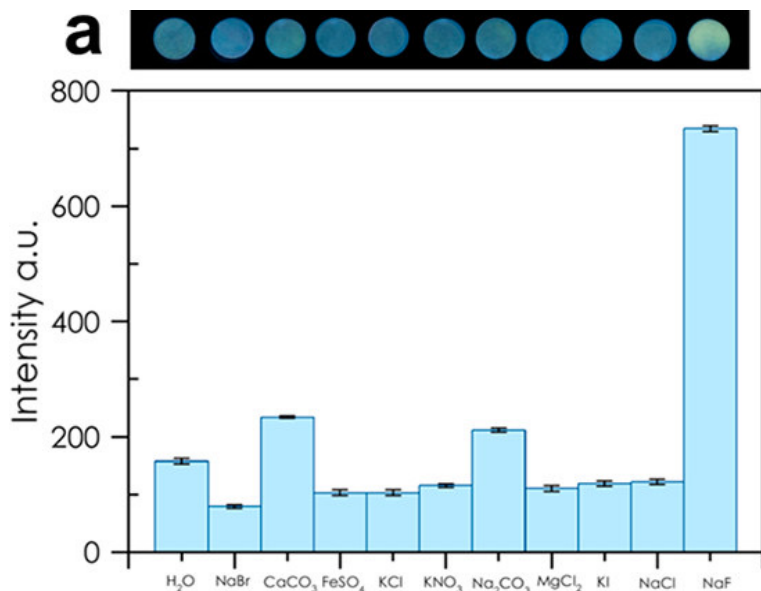
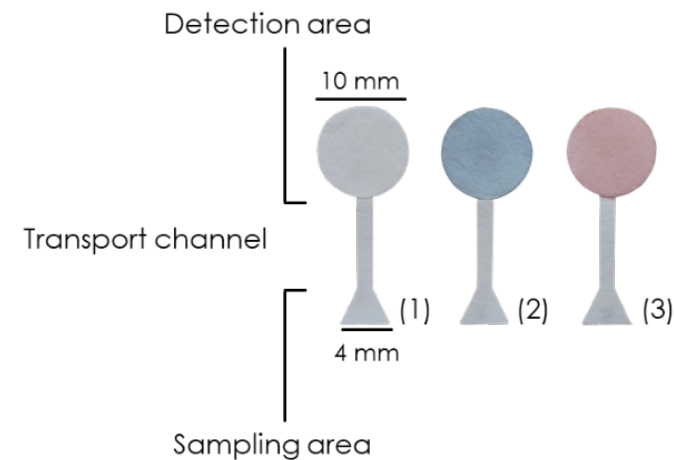
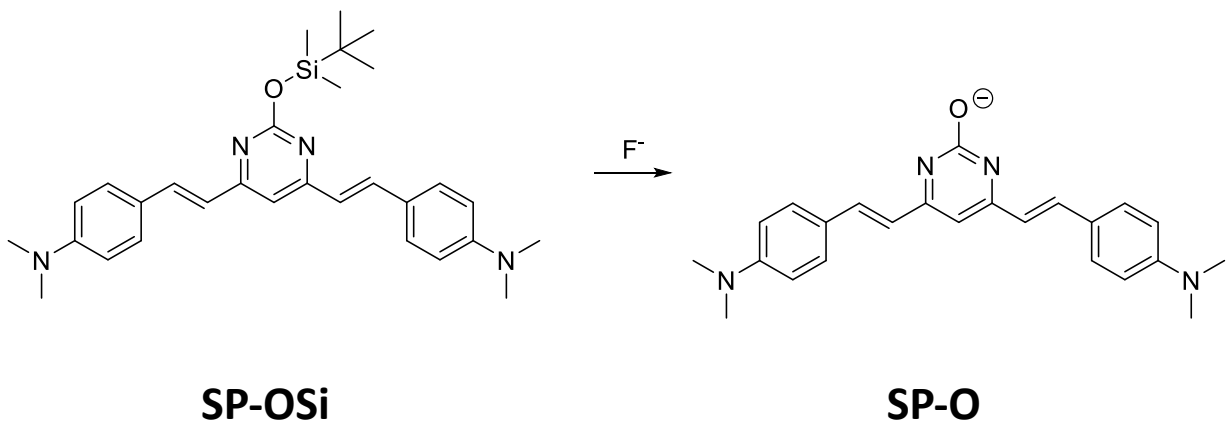


LOD: 3.92 μ M (0.16 mg/l)

LOQ: 11.87 μ M (0.49 mg/l)



Sensor en papel



LOD: 3.92 μM (0.16 mg/l)

LOQ: 11.87 μM (0.49 mg/l)

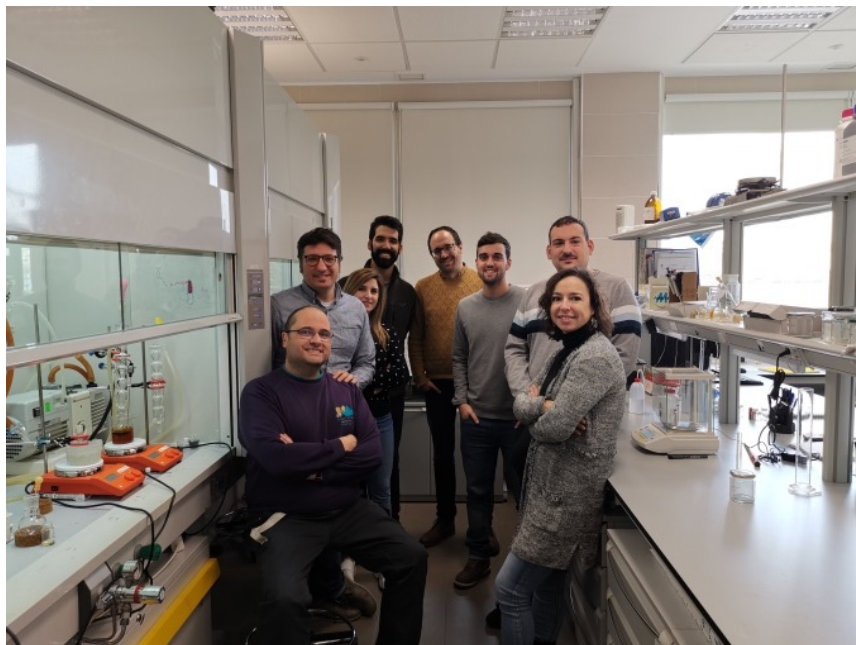


Según etiquetado:
1: 220 ppm
2: 250 ppm

Muestra)	Fluoruro medido (a: μM , b: ppm)	Añadido (μM)	Encontrado (μM)	Recuperación (%)
Agua del grifo	60.15 ± 1.73^a	20	87.93	109.70
		60	138.89	115.59
Té verde	28.08 ± 1.15^a	20	54.35	113.03
		60	95.32	108.21
Colutorio ¹	218.11 ± 1.85^b			
Pasta de dientes ²	$246,0 \pm 1,9^b$			



Agradecimientos



Grupo Química Orgánica Farmacéutica

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Inmaculada Ortiz Gómez
Ignacio de Orbe Payá
Luis Fermín Capitán Vallvey
Alfonso Salinas Castilla

Universidad de Jaén
Amparo Navarro Rascón

